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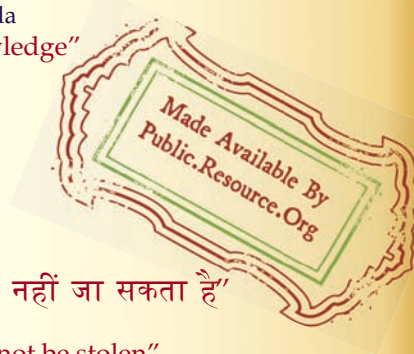
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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard
SPECIFICATION FOR
LUBRICATED COTTON GLAND PACKINGS

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SPECIFICATION FOR LUBRICATED COTTON GLAND PACKINGS

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Indian Standard

SPECIFICATION FOR LUBRICATED COTTON GLAND PACKINGS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 15 January 1979, after the draft finalized by the Gaskets and Packings Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Gland packings are used to contain fluid gases and slurries under extreme pressure and temperatures, abrasives and other difficult conditions. This standard relates to lubricated cotton gland packings. The requirements of other types of packings, namely, asbestos gland packing, proofed cotton duck gland packing, and jute and hemp or flax packing are covered in IS : 4687-1968*, IS : 4688-1968† and IS : 5414-1969‡ respectively.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960§. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard deals with the requirements and methods of tests for cotton gland packings with a mineral hydro-carbon lubricant. These types of packings are suitable for use in high or low speed centrifugal pumps, sludge pumps and water pumps with a temperature limit of 65°C.

1.2 Gland packings covered by this standard are not applicable for use in food industry.

*Specification for gland packing asbestos.

†Specification for proofed cotton duck gland packing.

‡Specification for gland packing, jute and hemp.

§Rules for rounding off numerical values (*revised*).

2. MATERIAL REQUIREMENTS

2.1 Yarn — The yarn shall be spun from a cotton having minimum staple length of 20 mm. The count of the single yarn shall not be coarser than 10s. More than one ply shall be twisted prior to use of machine. The packing shall be plaited throughout from yarns reasonably uniform in appearance and thickness. The cotton yarn content of the finished packing shall not be less than 40 percent by mass.

2.2 Lubricants — The lubricant shall be either petroleum jelly, a mixture of petroleum oil and petroleum jelly or a lime base grease and shall be suitable for use up to 65°C. Mineral filler or any bulky material shall not be added with it. The lubricant content determined as per Appendix A shall be between 40 to 50 percent by mass.

2.3 Graphite or Mica — The graphite shall be of more than 90 percent carbon contents and not coarser than 75 micron. Mica shall not be coarser than 150 micron. The graphite or mica content when determined as per Appendix A shall be between 5 to 15 percent by mass.

3. CONSTRUCTION

3.1 The packings shall be plaited on square plait principle to the size specified by the purchaser. Straight ends in the centre and the corner shall not exceed 25 percent of the total mass of the packing. In case of round section inner core of plain ends shall not exceed 10 percent of the total mass of the packing. The yarn shall be impregnated with lubricant and graphite or mica, prior to or during plaiting in order to ensure uniform dispersion.

4. SIZE

4.1 The cotton gland packing shall be manufactured in coils. The section and length of cotton gland packing shall be as agreed upon between the manufacturer and the purchaser.

4.2 The size of the packing shall not vary in thickness in any direction by more than the following:

<i>Size</i> mm	<i>Tolerance</i> mm
Up to and including 10	± 0.5
Over 10 and up to 35	± 1.0

5. WORKMANSHIP

5.1 The packing shall show no evidence of poor workmanship. The surface of the packings shall not have torn out threads.

6. SAMPLING

6.1 Lot — The quantity of coils of packings of the same size, designation and of one definite quality, delivered to one buyer against one despatch note shall constitute a lot.

6.2 The conformity of a lot to the requirement of this standard shall be determined on the basis of tests carried out on the sample selected from the lot.

6.3 Unless otherwise agreed between the manufacturer and the purchaser, the number of coils to be selected at random from a lot shall be in accordance with col 1 and 2 of Table 1.

TABLE 1 SAMPLE SIZE AND CRITERIA FOR CONFORMITY

(Clauses 6.3, 6.4, 6.5, 7.1 and 7.2)

No. of Coil in the Lot	Sample Size	Permissible Number of Defects	
		Visual and Dimensional	Flexibility
(1)	(2)	(3)	(4)
Up to 100	8	0	3
101 „ 300	13	1	4
301 „ 500	20	1	5
501 „ 1 000	32	2	6
1 001 and above	50	3	7

6.4 The coils selected according to **6.3** shall be inspected for construction, workmanship and dimensions. If the number of coils found not in conformity with the specified requirements is less than or equal to the corresponding number given in col 3 of Table 1, the lot shall be declared conforming to the requirements of visual and dimensional characteristics.

6.5 In case of those lots which have been found satisfactory according to **6.4**, a number of coils equal to the sample size given in col 4 of Table 1 shall be selected from those coils tested according to **6.4**. The specimen cut from these coils shall be subjected to tests given in **7.2**. The lot shall be declared conforming to the requirements of this specification if all the coils satisfy the relevant requirements.

7. TESTS

7.1 Visual and Dimensional Inspection — Each coil of packing selected in accordance with col 2 of Table 1 shall be inspected for the construction, workmanship and dimensions. The dimensions shall be measured carefully without applying pressure to an accuracy of 0.1 mm with a slide gauge, at least, at six different positions along the length. The mean of the six measurements thus made shall be within the variations specified in **4.2**.

7.2 Flexibility — A suitable length of packing when bent through 180° around the rod, the diameter of which is four times the thickness of the packing shall not separate into layer.

8. MARKING

8.1 Each coil of the packing shall be marked with the following:

- a) Manufacturer's name or trade-mark,
- b) Dimension of packing, and
- c) Month and year of manufacture.

8.1.1 Packing coils may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

9. PACKING

9.1 Packings shall be packed in sealed parcels of suitable size and shall be adequately protected against damage and ingress of dust in transit.

A P P E N D I X A

(Clauses 2.2 and 2.3)

METHODS OF TESTS FOR LUBRICATED COTTON GLAND PACKINGS

A-1. DETERMINATION OF LUBRICANT CONTENT

A-1.1 Procedure

A-1.1.1 Take a Soxhlet thimble and a Whatma's filter paper of 10 cm diameter, previously extracted with carbon tetrachloride, and place them in a weighing bottle.

A-1.1.2 Place the weighing bottle (with the thimble and filter paper) with the lid offset, in an oven maintained between 105°C and 110°C for

one hour. Replace the lid and cool in a desiccator to room temperature and weigh.

A-1.1.3 Unplait a representative section of the packing not less than 5 g in mass, over the open filter paper so that all materials which are dislodged fall on the filter paper.

A-1.1.4 Wrap the sample in the filter paper and insert into the thimble. The thimble with the filter paper and sample should be replaced in the weighing bottle which should once again be dried in the oven for one hour as before and cooled in a desiccator to room temperatures and weighed.

A-1.1.5 Place thimble with the sample wrapped in the filter paper in a Soxhlet extraction apparatus fitted with a water cooled Liebig condenser.

A-1.1.6 Extract for one hour (or more till the extraction is colourless) with carbon tetrachloride. The volume of the solvent to be used should be at least three times the capacity of the Soxhlet extractor.

A-1.1.7 Dry an evaporating basin in an oven at 105°C for one hour, cool to room temperature in a desiccator and weigh.

A-1.1.8 Transfer the solution from the extraction flask to the basin. Rinse the flask with a small quantity of fresh carbon tetrachloride and transfer to the basin.

A-1.1.9 Place the basin and its contents in an oven for half an hour at 105°C, cool in a desiccator to room temperature and weigh.

A-1.2 Calculation

$$\text{Grease, oil content, percent} = \frac{W_4 - W_3}{W_2 - W_1} \times 100$$

where

W_1 = mass of weighing bottle, thimble and filter paper (see **A-1.1.2**);

W_2 = mass of weighing bottle, thimble and filter paper with sample (see **A-1.1.4**);

W_3 = mass of dry evaporating basin; and

W_4 = mass of evaporating basin with extract.

A-2. DETERMINATION OF GRAPHITE OR MICA CONTENT

A-2.1 Procedure

A-2.1.1 Dry the Soxhlet thimble and its contents after extraction carried

out as given under **A-1.1.6**, in an oven maintained between 105°C to 110°C for one hour and cool in a desiccator to room temperature.

A-2.1.2 Take filter paper and contents, open the filter paper and carefully dislodge the graphite or mica on to the filter paper by gently untwisting the yarn.

A-2.1.3 Discard the yarn.

A-2.1.4 Weigh the weighing bottle with filter paper and graphite or mica.

A-2.2 Calculation

$$\text{Graphite or mica content, percent} = \frac{W_5 - W_1}{W_2 - W_1} \times 100$$

where

W_5 = mass of weighing bottle, thimble and filter paper with graphite or mica.